WHAT IS CLAIMED IS

1.   A method of interactively determining values of design variables for an engineering design, the engineering design having a structure, design variables associated with the structure and metrics for evaluating the performance of the design, the method comprising:

assigning initial values to the design variables;

conducting a simulation of the design to determine values of the metrics of the design based on the initial values of the design variables;

identifying metrics which a designer desires to improve;

conducting a sensitivity analysis by varying each design variable in turn over a range of values for the design variable to determine effects of changes in design variables on the metrics;

selecting one or more design variables whose values are to be changed based on the results of the sensitivity analysis; and

changing the value of the selected design variables based on the results of the sensitivity analysis.

2.   The method of claim 1, further comprising: conducting a simulation based on the revised values to confirm the values of the metrics of the design with revised values.

3.   The method of claim 2, further comprising determining whether a stopping criterion is satisfied and if so terminating the method, otherwise further determining whether the results of the sensitivity analysis remain reliable and, if so, selecting further design variables whose values are to be changed based on the results of the sensitivity analysis and changing the values of the selected further design variables based on the results of the sensitivity analysis.

4.   The method of claim 3, further comprising: determining whether a structural change to the design is desired if the further determination of the results of the sensitivity analysis is that they are no longer reliable and if so, changing the structure of the design and conducting a further iteration of the method by assigning initial values to the design variables, otherwise iterating the method by further conducting a sensitivity analysis.

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5.   The method of claim 1, wherein conducting a sensitivity analysis by varying each design variable in turn over a range of values for the design variable to determine effects of changes in design variables on the metrics comprises visually presenting results to a designer for review.

6.   The method of claim 1, wherein the step of conducting a sensitivity analysis by varying each design variable in turn over a range of values comprises varying each design variable over a subset of the range of values of the design variable.

7.   The method of claim 1, wherein the step of conducting a sensitivity analysis by varying each design variable in turn over a range of values comprises conducting a sensitivity analysis by varying each of a subset of design variables over a range of values of the varied design variable.

8.   A method of interactively determining values of design variables for an engineering design, the engineering design having a structure, design variables associated with the structure and metrics for evaluating the performance of the design, the method comprising:
        assigning initial values to the design variables;
        conducting a simulation of the design to determine values of the metrics of the design based on the initial values of the design variables;
        identifying metrics which a designer desires to improve;
        conducting a sensitivity analysis by varying one or more sets of design variables, the sets of design variables being varied in combination over a correspondingly dimensioned range of values for the design variables to determine effects of changes in the set of design variables on the metrics;
        selecting one or more sets of design variables whose values are to be changed based on the results of the sensitivity analysis; and
        changing the values of the selected set of design variables based on the results of the sensitivity analysis.

9.   A system for determining values of design variables for an engineering design, the engineering design having a structure, design variables associated with the structure and metrics for evaluating the performance of the design, the system comprising:

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storage means for associating initial values with each design variable;

a simulator for determining values of the metrics of the design based on the initial values of the design variables;

computing means varying each design variable in turn over a range of values for the design variable to determine effects of changes in design variables on the metrics;

display means for visually displaying the results of design variable variation on metrics; and

means for selecting and changing the values of one or more design variables based on the results of varying each design variable.

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